WHAT IS CLAIMED IS:

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1. A method of transducing the conformational change of a signaling aptamer upon binding a ligand to a differential signal generated by a reporter molecule comprising the steps of:

contacting the signaling aptamer with the ligand wherein the signaling aptamer binds the ligand; and

detecting the differential signal generated by the reporter molecule resulting from the conformational change of the signaling aptamer upon binding the ligand thereby transducing the conformational change.

2. The method of claim 1, wherein the differential signal comprises an optical signal, an electrochemical signal or an enzymatic signal.

3. The method of claim 2, wherein the optical signal is selected from the group consisting of fluorescence, colorimetric

intensity, anisotropy, polarization, lifetime, emission wavelength, and excitation wavelength.

4. The method of claim 1, wherein the signaling aptamer comprises a reporter molecule appended to a nucleic acid binding species (aptamer).

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5. The method of claim 4, wherein the reporter molecule is appended to the nucleic acid binding species (aptamer) by covalent coupling or non-covalent coupling.

6. The method of claim 5, wherein the covalent coupling of the reporter molecule to the aptamer occurs during chemical synthesis, during transcription or post-transcriptionally.

7. The method of claim 5, wherein the reporter molecule is a dye.

8. The method of claim 7, wherein the dye is a fluorescent dye.

9. The method of claim 8, wherein the fluorescent dye is selected from the group consisting of acridine and fluorescein.

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10. The method of claim 4, wherein the aptamer is selected from the group consisting of RNA, DNA, modified RNA and modified DNA, and wherein the aptamer is not a protein or a biopolymer.

11. The method of claim 1, wherein the ligand is a molecule bound by the signaling aptamer wherein the molecule is not a nucleic acid sequence.

12. The method of claim 1, wherein the ligand is in solution.

13. The method of claim 1, wherein the signaling aptamer is in solution or immobilized on a solid support.

14. The method of claim 13, wherein the signaling aptamer is immobilized on a solid support in parallel wherein the immobilization forms signaling aptamer chips.

15. A method of transducing the conformational change of a signaling aptamer upon binding a ligand to an optical signal generated by a fluorescent dye comprising the steps:

contacting the signaling aptamer with the ligand wherein the signaling aptamer binds the ligand; and

detecting the optical signal generated by the fluorescent dye resulting from the conformational change of the signaling aptamer upon binding the ligand thereby transducing the conformational change.

16. The method of claim 15, wherein the optical signal is selected from the group consisting of fluorescence, colorimetric intensity, anisotropy, polarization, lifetime, emission wavelength, and excitation wavelength.

17. The method of claim 15, wherein the signaling aptamer comprises a fluorescent dye appended to a nucleic acid

binding species (aptamer) by covalent coupling of the fluorescent dye to the aptamer.

18. The method of claim 17, wherein the fluorescent dye replaces a nucleic acid residue in the aptamer or is inserted between two nucleic acid residues in the aptamer; wherein the placement does not interfere with the ligand-binding site of the aptamer.

19. The method of claim 17, wherein the fluorescent dye is fluorescein or acridine.

20. The method of claim 17, wherein the aptamer is an anti-adenosine RNA aptamer or an anti-adenosine DNA aptamer.

21. The method of claim 20, wherein the anti-adenosine RNA aptamer is ATP-R-Ac13.

22. The method of claim 20, wherein the anti-adenosine DNA aptamer is DFL7-8.

23. The method of claim 15, wherein the ligand is a molecule bound by the signaling aptamer wherein the molecule is not a nucleic acid sequence.

24. The method of claim 23, wherein the ligand is adenosine.

25. The method of claim 15, wherein the ligand is in solution.

26. The method of claim 15, wherein the signaling aptamer is in solution or immobilized on a solid support.

27. The method of claim 26, wherein the signaling aptamer is immobilized on a solid support in parallel wherein the immobilization forms signaling aptamer chips.

28. A method for quantitating the ligand of claim 15 comprising the steps of:

contacting the signaling aptamer of claim 15 with the ligand wherein the signaling aptamer binds the ligand; and

measuring the increase in the optical signal of claim 15 resulting from the signaling aptamer binding the ligand; wherein the increase in the optical signal positively correlates with the quantity of ligand bound to the signaling aptamer.